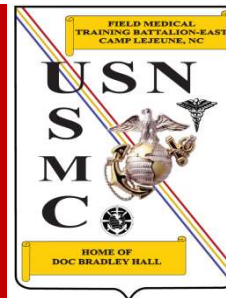
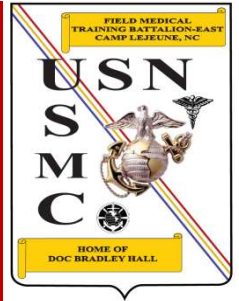


# MANAGE HEMORRHAGE IN TACTICAL FIELD CARE

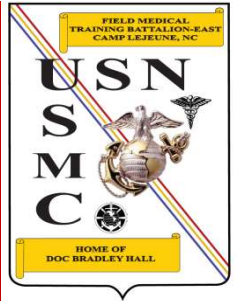


# OVERVIEW- MARCH



- **Types of Hemorrhage**
  - **Signs and Symptoms of External and Internal Hemorrhage**
- **Tactical Field Care**
- **Methods of Hemorrhage Control in Tactical Field Care**

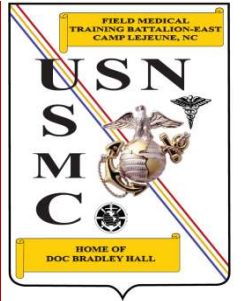
# LEARNING OBJECTIVES



Please Read Your  
Terminal Learning Objectives  
And  
Enabling Learning Objectives

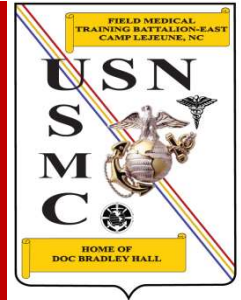


# BACKGROUND



- Historically, 20% of injured combatants die on the battlefield
- Many of these deaths could have been prevented with timely intervention.

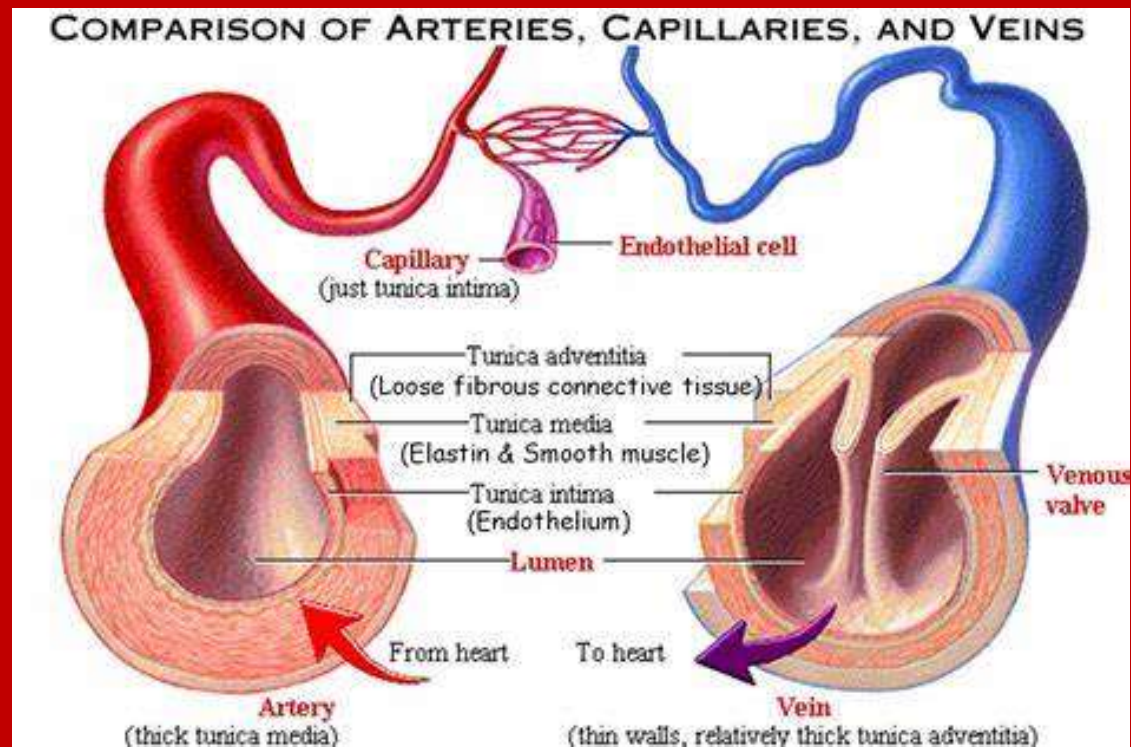
# BLOOD VESSEL ANATOMY



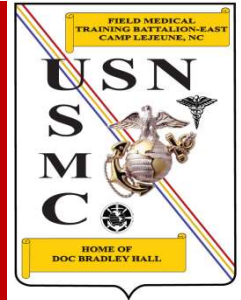
➤ Artery

➤ Vein

➤ Capillary



# BLOOD VESSEL ANATOMY



## ➤ Major External Arteries

➤ Carotid

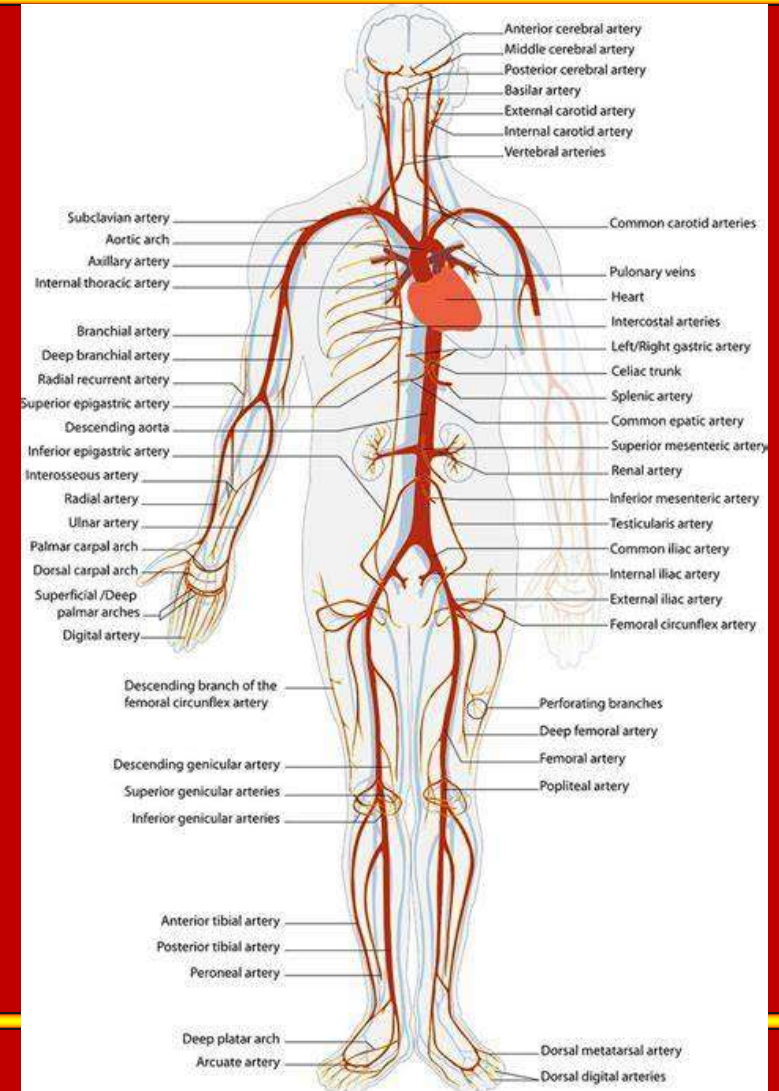
➤ Femoral

➤ Brachial

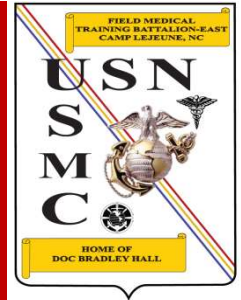
## ➤ Major Internal Arteries

➤ Descending Aorta

➤ Iliac



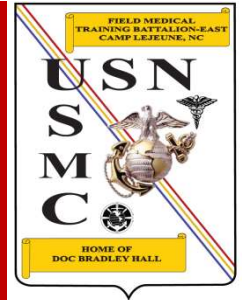
# Blood Vessel Indicators



- Arterial - **Bright red** blood, spurting
- Venous - **Dark red**, steady even flow
- Capillary - **Brick red**, oozing

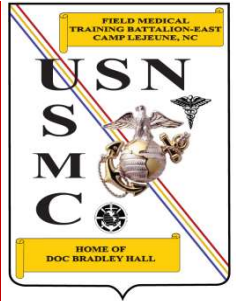


# NAME THAT BLEED



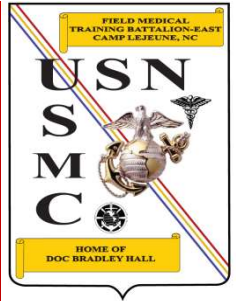
- This is a small, surgical cut. Pay attention to the strength, color, and cadence of the bleed.

# TYPES OF HEMORRHAGE



- External Hemorrhage
  - Loss of blood from wounds that damage the large vessels of the extremities or junctional spaces
- Internal Hemorrhage
  - Loss of blood from wounds that damage the large vessels or organs inside the chest or abdomen

# EXTERNAL HEMORRHAGE



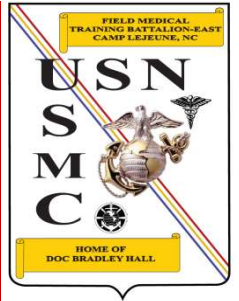
- Easy to recognize: blood everywhere

## Causes

- Penetrating wounds
  - Gunshot, stabs and shrapnel wounds
- De-gloving wounds
  - Vehicle accidents
- Amputating wounds
  - Blasts from artillery, mortars or landmines



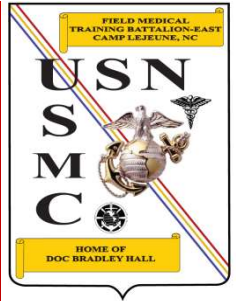
# EXTERNAL HEMORRHAGE



## Signs and Symptoms

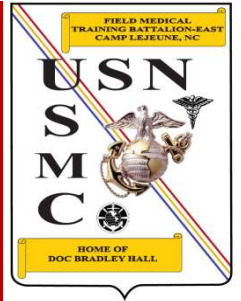
- Massive blood loss
  - Pooling blood
  - Blood soaked clothing
  - Active hemorrhage from injury site
- Obvious signs of battlefield shock:
  - Altered mental status in the absence of a TBI
  - Weak or absent radial pulse

# EXTERNAL HEMORRHAGE



- You must determine which bleeding is **LIFE-THREATENING** and which is non-life threatening.
- The best chance of survival with an external hemorrhage is rapid identification and management of the bleed

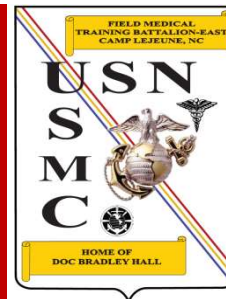
# INTERNAL HEMORRHAGE



## Causes

- Blunt trauma
- Concussion injuries from blasts
- Vehicle accidents
- Falling from heights
- Closed fractures/Pelvic Fractures

# INTERNAL HEMORRHAGE



- Blood loss into the chest or abdomen can't be controlled in the field.
- Casualties with major, internal vascular injuries frequently die in the field.
- Bleeding from any body orifice is serious
- Indications: bleeding from mouth, rectum, or blood in the urine
- Requires surgical intervention
- Treat (if possible) and TACEVAC

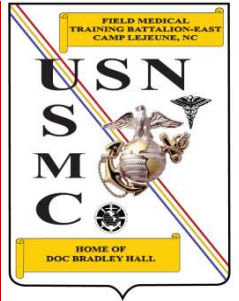
# INTERNAL HEMORRHAGE



## Signs and Symptoms

- Hematemesis (vomiting of bright red blood)
- Hemoptysis (coughing up of bright red blood)
- Melena (black tarry stools)
- Hematochezia (bright red blood from the rectum)
- Hematuria (blood in the urine)

# INTERNAL HEMORRHAGE

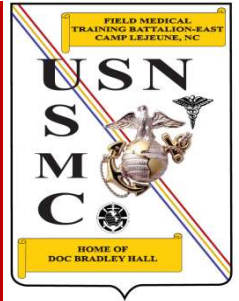


## Signs and Symptoms

- Ecchymosis (bruising)
- Rapidly forming hematoma and edema
- Rigidity with or without rebound tenderness upon palpation of abdomen
- Signs of shock

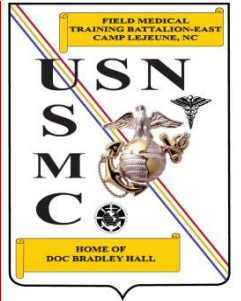


# Tactical Field Care



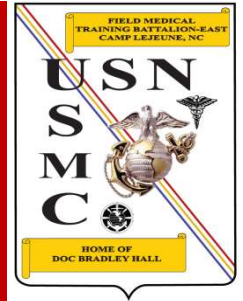
- Distinguished from Care Under Fire by – A reduced level of hazard from hostile fire
- More time available to provide care based on the tactical situation
- Medical gear is still limited to that carried by the medic or corpsman or unit members (may include gear in tactical vehicles)

# Tactical Field Care



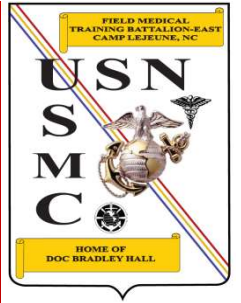
- May consist of rapid treatment of the most serious wounds with the expectation of a re-engagement with hostile forces at any moment, *or*
- There may be ample time to render whatever care is possible in the field.
- Time to evacuation may vary from minutes to several hours or longer.

# Tactical Field Care



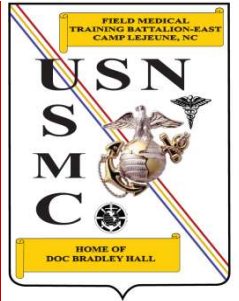
- Establish a Security Perimeter
- Triage Casualties as required
- Casualties with these injuries must be treated first:
  - ❖ Massive Bleeding
  - ❖ Penetrating Trauma to the Torso
  - ❖ Airway Compromise
  - ❖ Respiratory Distress
  - ❖ Altered Mental Status

# Tactical Field Care



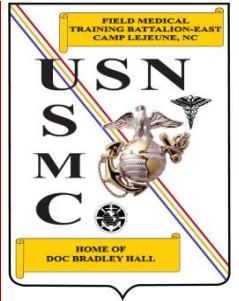
- Take all weapons and communications equipment away from casualties with an altered mental status immediately
  - They may use weapons or radios inappropriately
  - Possible causes of altered mental status are Traumatic Brain Injury (TBI), shock, hypoxia, and pain medications

# Massive Hemorrhage



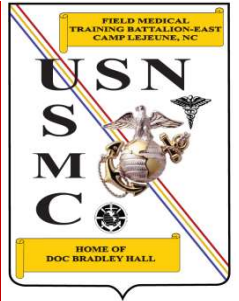
- Assess for massive hemorrhage.
- Control all sources of life-threatening bleeding.
- If not already done, use a tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet application or for any traumatic amputation.

# Massive Hemorrhage



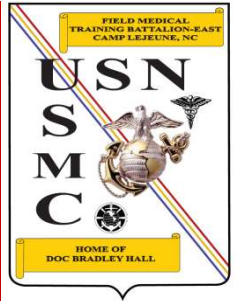
- CUF only allows for TQ application during Massive Hemorrhage .
  - ❖ In TFC, there are more options dependent on the bleed
- Control all sources of external life-threatening bleeding

# Massive Hemorrhage



- If TQ applied during CUF is no longer functional, when reassessed, it must be replaced. Apply a second tourniquet side-by-side with the first
- When possible, check the distal pulse. It should be absent, when TQ is applied correctly

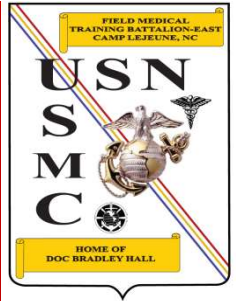
# Massive Hemorrhage



- Tourniquets placed hastily over uniforms may be less effective than tourniquets applied directly to the skin.
- During reassessment, if a tourniquet needs to be repositioned, remove sufficient uniform materiel to place another tourniquet directly over the skin and tighten it. The initial tourniquet can now be released to assess for continued bleeding control.
- Ensure that bleeding is stopped.



# Additional Options for External Hemorrhage



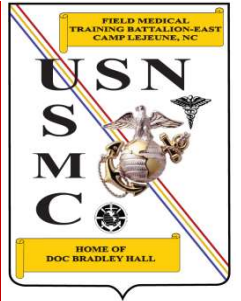
- Direct Pressure
- Hemostatic Agents
- Xstat
- Pressure Dressing
- Junctional Tourniquet
- IT Clamp

# Direct Pressure



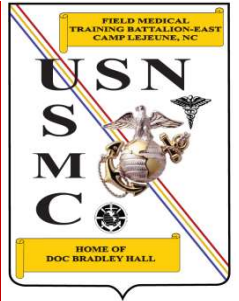
- Can be used as a temporary measure for external bleeds
  - It is hard to use direct pressure alone to maintain control of big bleeders while moving a casualty.
  - Ensure there is a counter pressure at the back of the casualty
- Don't let up pressure to check the wound until you are prepared to control the bleeding with a hemostatic agent or a tourniquet

# HEMOSTATIC AGENTS



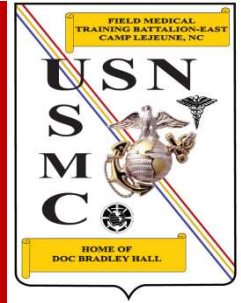
- Hemostatic dressings can be used to control compressible hemorrhage from wounds where a tourniquet cannot be effectively applied
- To control bleeding when a tourniquet must be removed in a prehospital setting because evacuation will take longer than two hours.

# HEMOSTATIC AGENTS



- Hemostatic dressings should be applied with at least 3 minutes of direct pressure (optional for Xstat)

# CoTCC Recommended Hemostatic Agents



•Combat Gauze

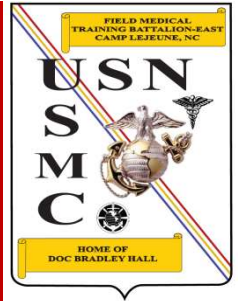


•Celox Gauze



•ChitoGauze

# Combat Gauze

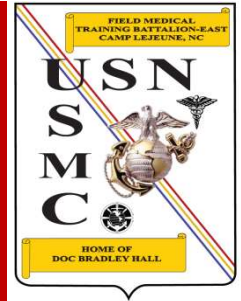


- A 3-inch x 4-yard roll of sterile gauze impregnated with kaolin, a material that causes blood to clot.
- Found in lab studies and actual use to be safe and effective in controlling bleeding that would otherwise be fatal.
- It is recommended by CoTCCC as first choice for hemostatic dressing.

# Wound Packing with a Hemostatic Dressing



# ALTERNATE HEMOSTATIC AGENTS



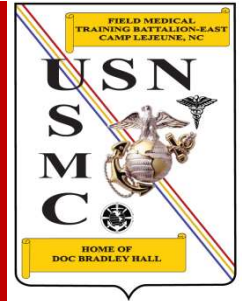
- Celox Gauze



- Chito Gauze

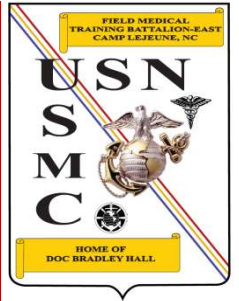
- Both are used the same way as Combat Gauze

# XSTAT



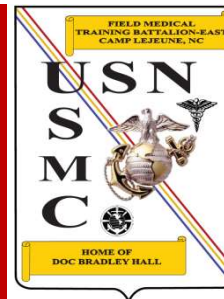
- Xstat is the first expanding wound dressing.
- FDA cleared for life-threatening bleeding
- Best for deep, narrow-tract junctional wounds
- Syringe-like applicator injects compressed mini-sponges into deep wounds.

# ALTERNATE HEMOSTATIC AGENTS

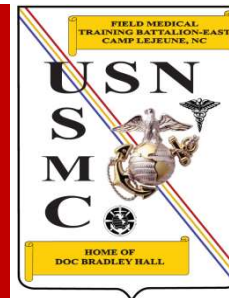


- Mini-sponges rapidly expand on contact with blood.
- Compresses the wound to stop bleeding.
- XStat is not to be removed in the field, but additional XStat, other hemostatic adjuncts, or trauma dressings may be applied over it.

# XSTAT Video



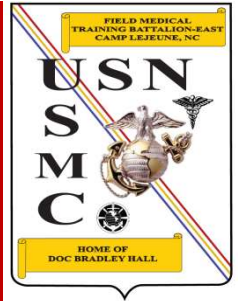
# Pressure Dressings



- Pressure dressings can be applied to extremity, chest, abdominal, and head wounds.
- It also gives it the ability for self-application.

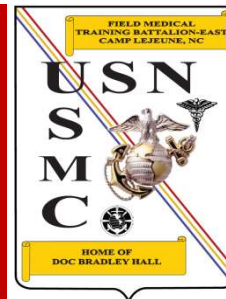


# H Bandage



- These pressure dressing bandages are 4” wide elastic wraps with 8” x 10” absorbent cotton pad attached close to the end of one side of the elastic wrap.
- In the middle on the elastic wrap is a hard plastic H-anchor that allows for wrapping the dressing around the anchor to apply pressure directly over wound

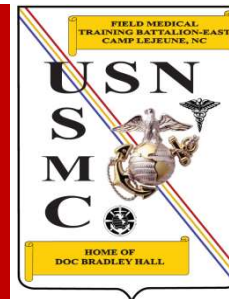
# Pressure Dressings



- Pressure dressings can be applied to extremity, chest, abdominal, and head wounds.

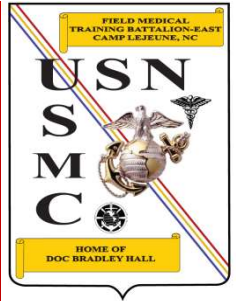


# Pressure Dressings



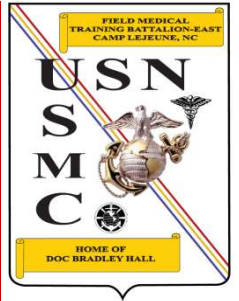
- Open and remove the dressing.
- Place pressure dressing over injury with steady pressure, isolating the Velcro end.
- Pull draped elastic end and secure to Velcro end.
- Feed wrap through lower leg of H anchor, pulling firmly.

# Pressure Dressings



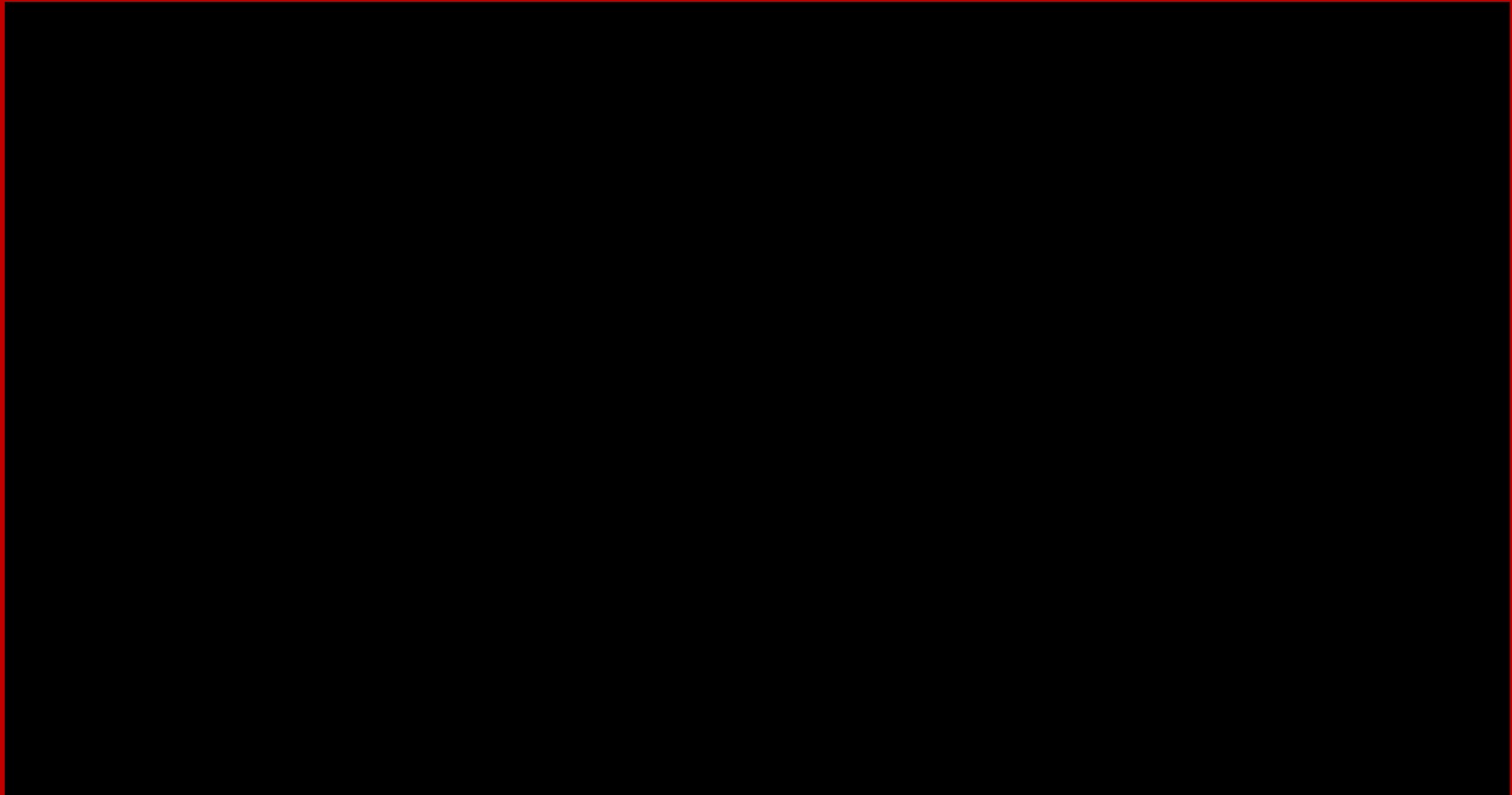
- Wind wrap back around injury site and feed wrap through upper leg of H anchor, pulling firmly.
- Continue wrapping elastic wrap around injury site, keeping the wrap tight.
- Firmly attach Velcro end of wrap to the dressing.

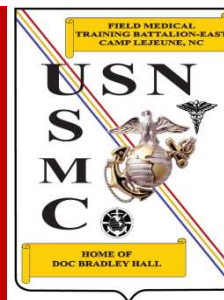
# Pressure Dressings



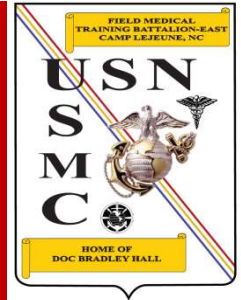
- If hemorrhage continues
  - DO NOT remove the first dressing
  - Apply a second dressing over the first
- If hemorrhage still cannot be controlled:
  - Use a tourniquet!
- Once hemorrhage is controlled, cover the entire dressing with a bandage

# Applying a Pressure Dressing





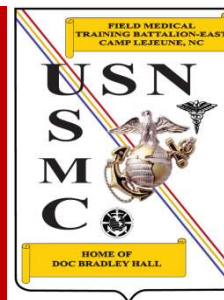
# HEMOSTATIC AGENTS

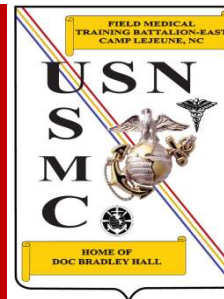


- Application of Hemostatic Agents

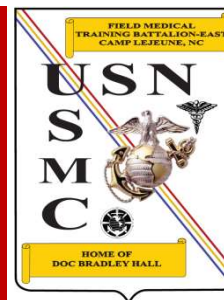
## DEMO



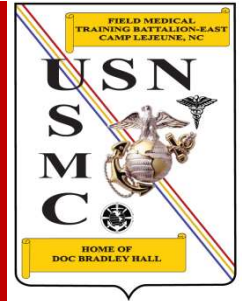




# PRACTICAL APPLICATION

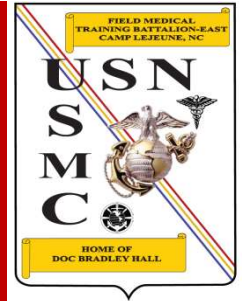


# TACTICAL FIELD CARE and Junctional Tourniquets



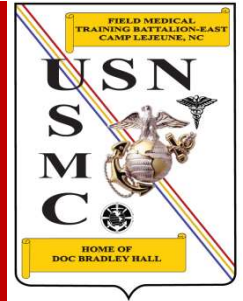
- If the bleeding site is appropriate for use of a junctional tourniquet, immediately apply a CoTCCC-recommended junctional tourniquet. Do not delay in the application of the junctional tourniquet once it is ready for use. Combat Gauze applied with direct pressure should be used if a junctional tourniquet is not available or while the junctional tourniquet is being readied for use.

# TACTICAL FIELD CARE and Junctional Tourniquets

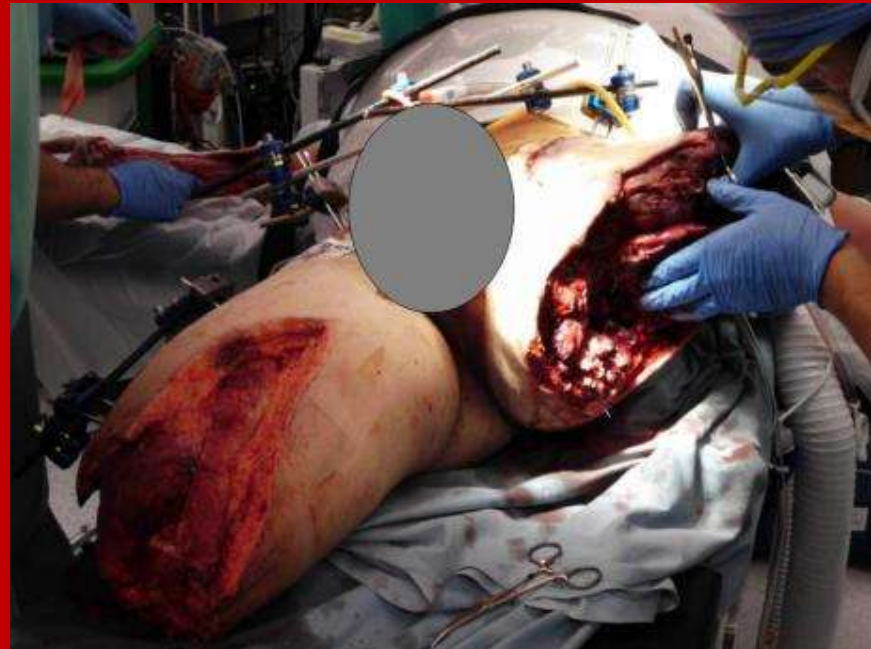


- Junctional Hemorrhage
  - Groin
  - Buttocks
  - Perineum
  - Axilla
  - Base of the neck

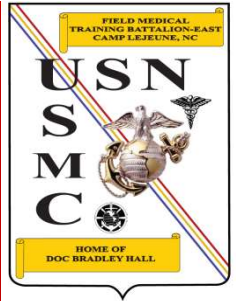
# TACTICAL FIELD CARE and Junctional Tourniquets



- A brief to the Defense Health Board in 2011 provided statistics with increased amputation rates



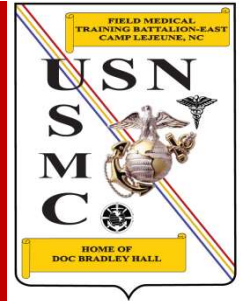
# TACTICAL FIELD CARE and Junctional Tourniquets



- Amputation Summary:

- Amputation rates for evacuated Marines increased from 6 to 18%
- The rate in December 2010 was 38%
- The double amputation rate increased
- Increased genitalia injuries
- Most of the amputations were high proximal injuries , which are extremely disabling.

# TACTICAL FIELD CARE and Junctional Tourniquets



## ■ IED Comparison

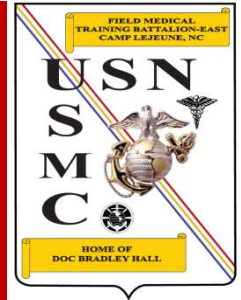
### ➤ Iraq

- Large amount of explosives – recycled 155 shells
- Command or vehicle-detonated
- Destroy vehicles

### ➤ Afghanistan

- Smaller amount of explosives
- Homemade explosives
- Personnel pressure-detonated
- Designed to maim

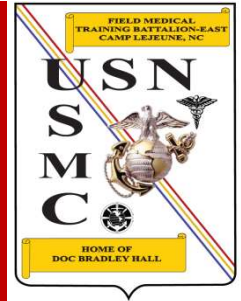
# TACTICAL FIELD CARE and Junctional Tourniquets



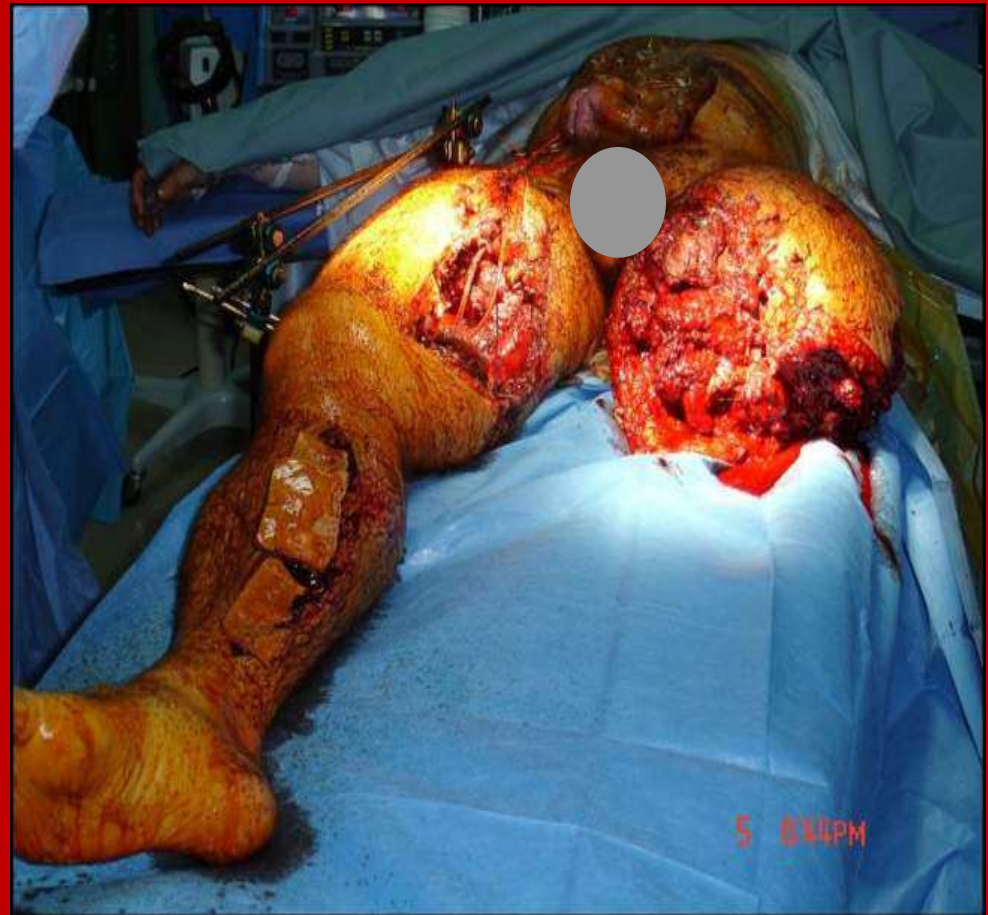
## Dismounted Complex Blast Injury (DCBI)



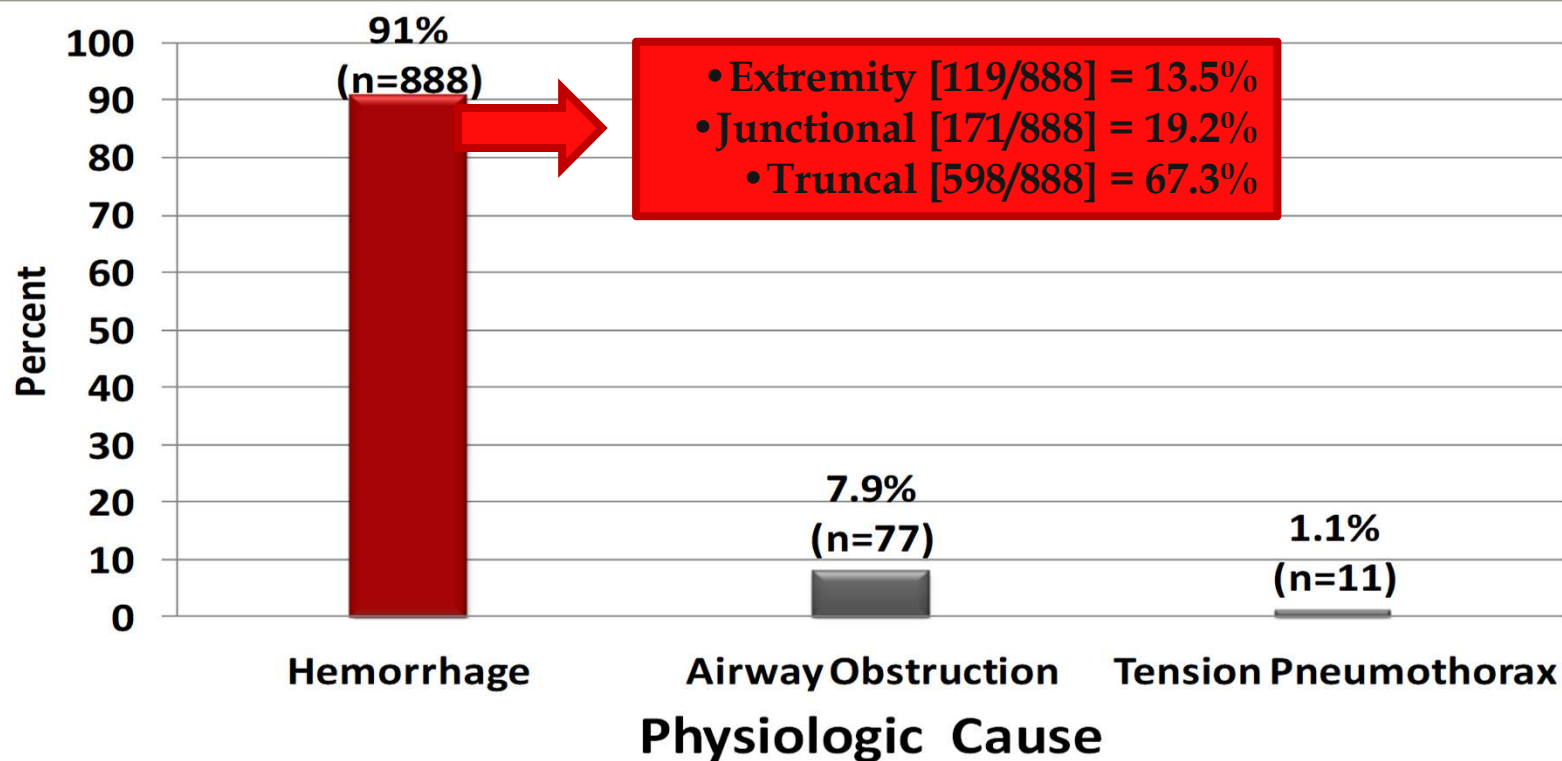
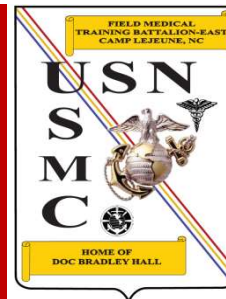
# TACTICAL FIELD CARE and Junctional Tourniquets



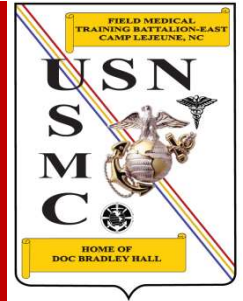
**Wounds that result in junctional hemorrhage are typically caused by dismounted IED attacks**



# TACTICAL FIELD CARE and Junctional Tourniquets



# TACTICAL FIELD CARE and Junctional Tourniquets

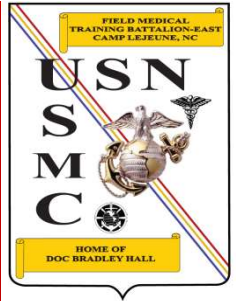


Groin hemorrhage is the most common junctional hemorrhage

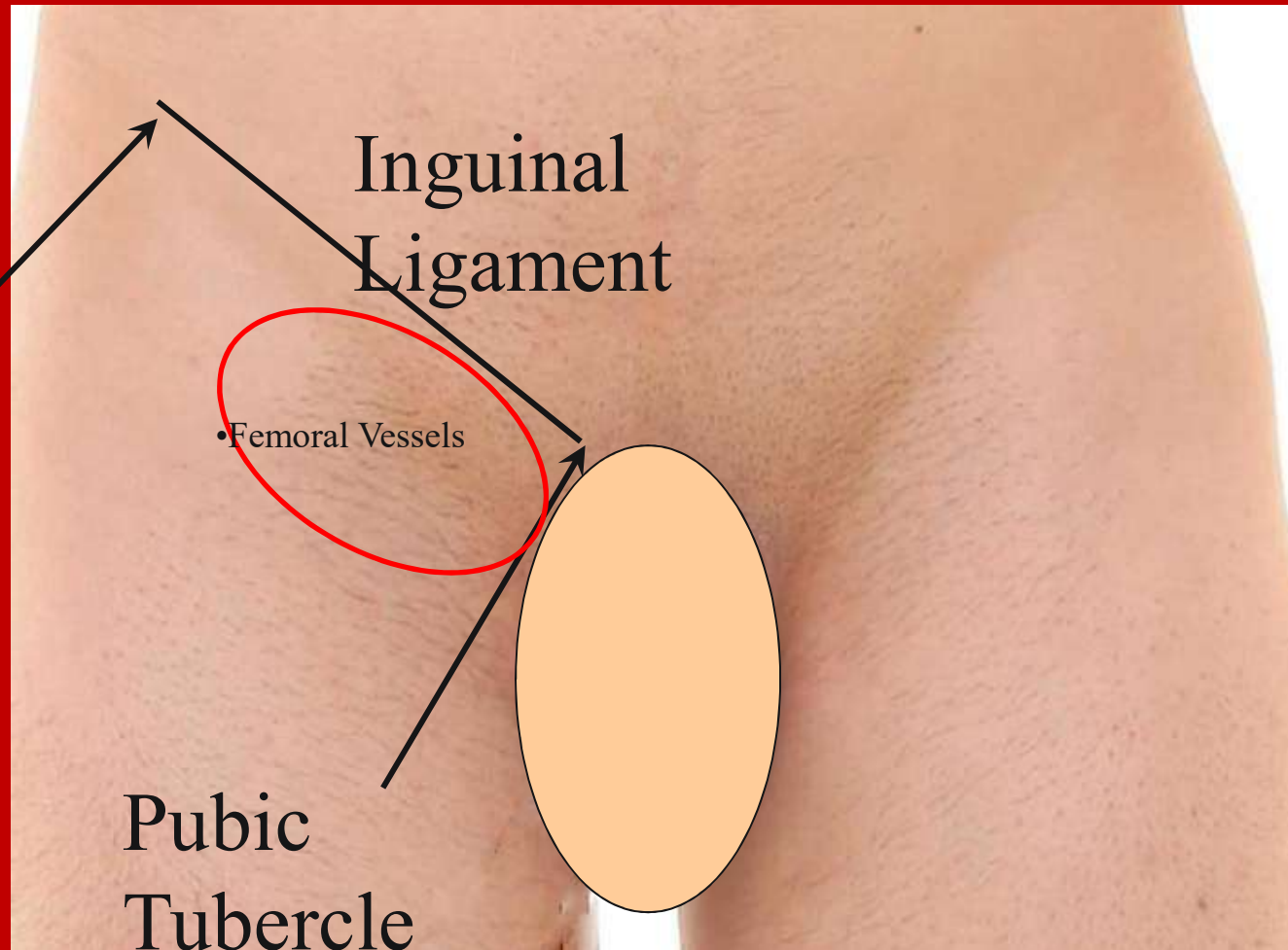
Effective application of the junctional tourniquet depends on accurate location

Devices work by putting pressure on the artery(s) of the inguinal region

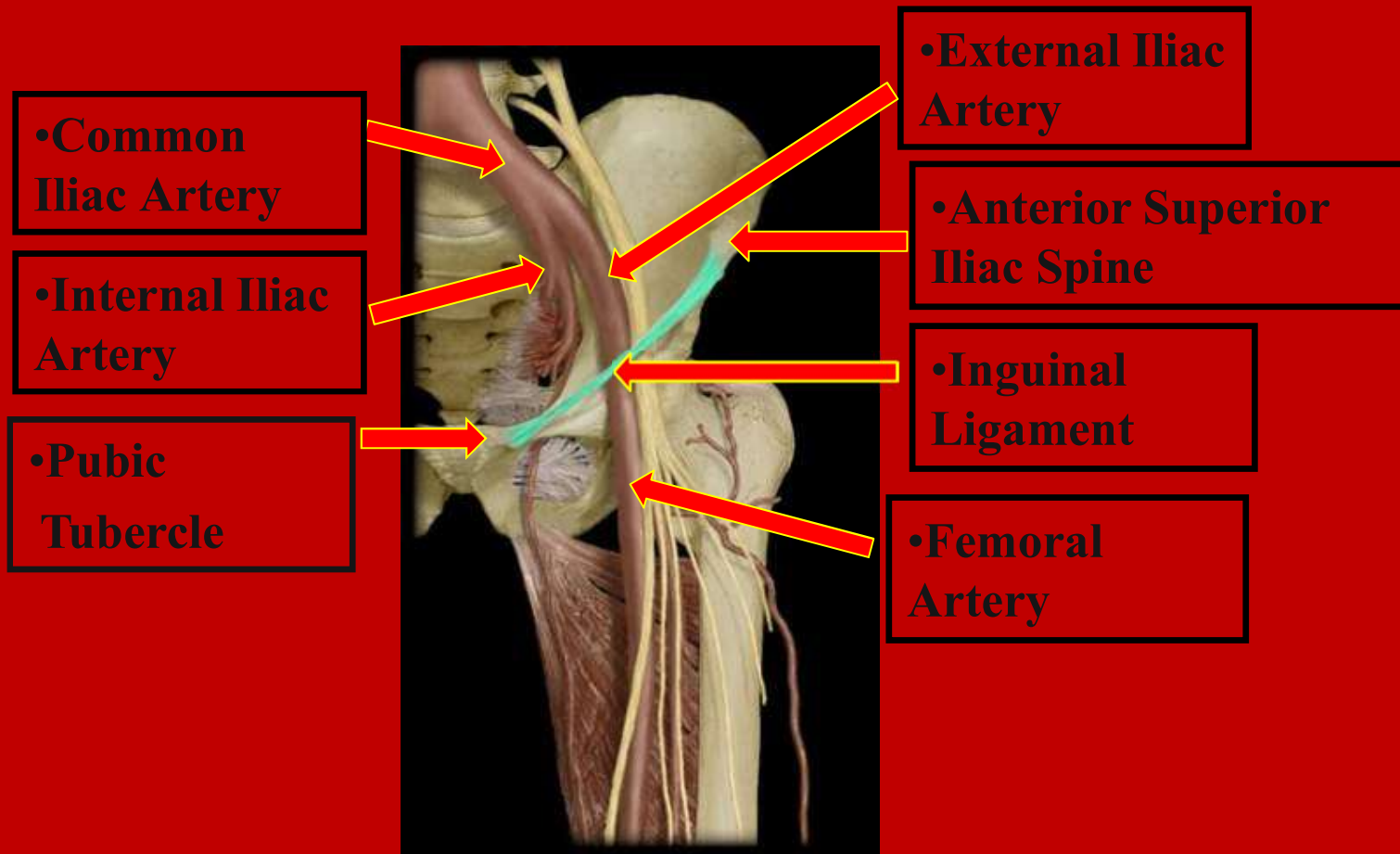
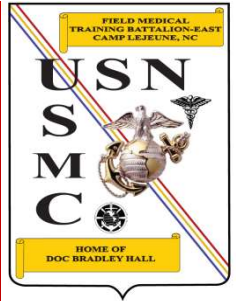
# Superficial Anatomy of the Groin



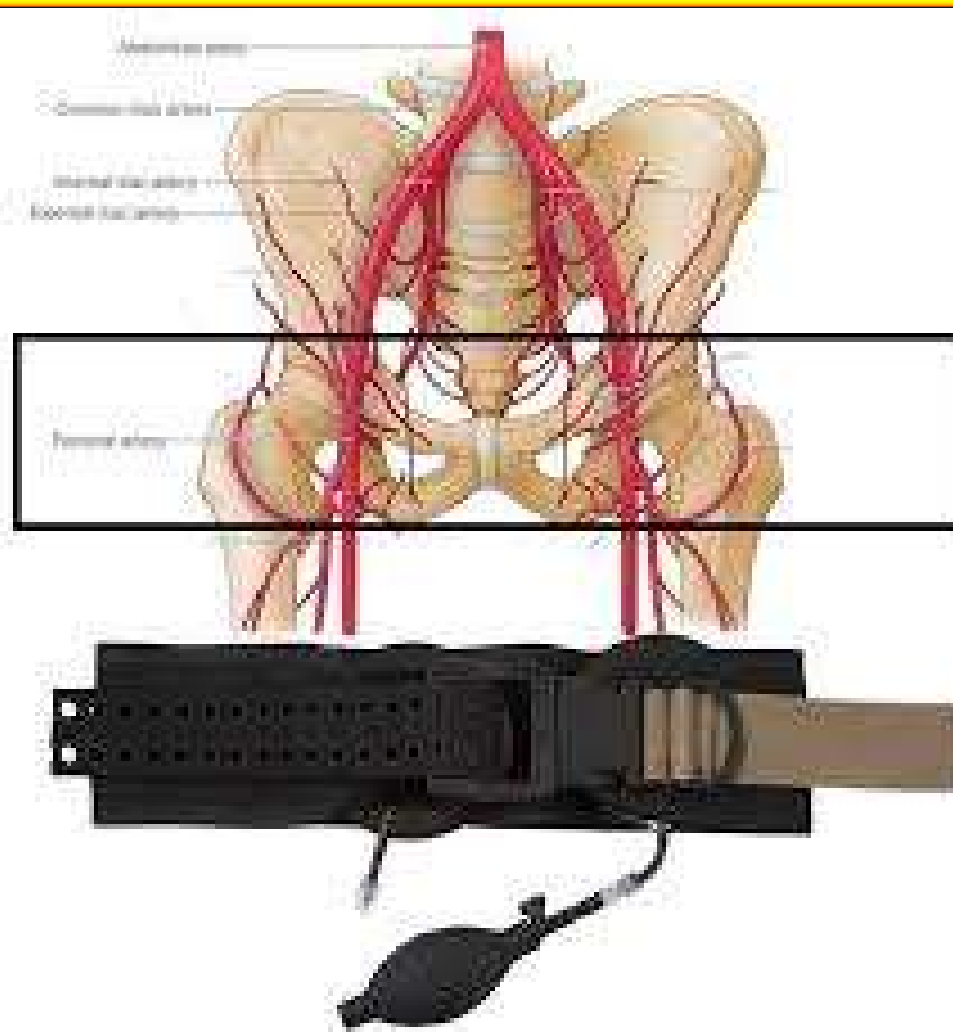
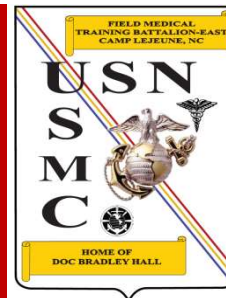
Anterior  
Superior  
Iliac Spine



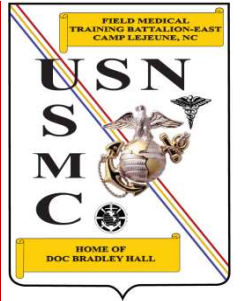
# Anatomy of the Inguinal Region



# Anatomy of the Inguinal Region



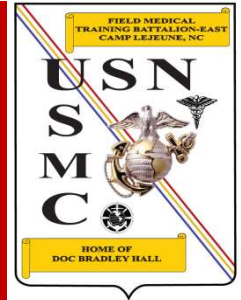
# TACTICAL FIELD CARE and Junctional Tourniquets



**Three CoTCCC recommended junctional tourniquets:**

- **The Combat Ready Clamp (CRoC)**
- **The Junctional Emergency Treatment Tool (JETT)**
- **The SAM Junctional Tourniquet (SJT)**

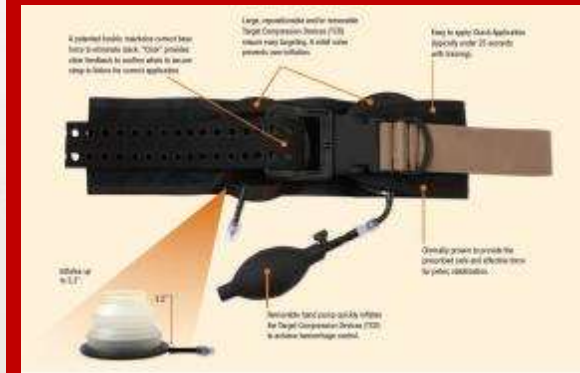
# TCCC Management of Junctional Hemorrhage



**Combat Ready  
Clamp**

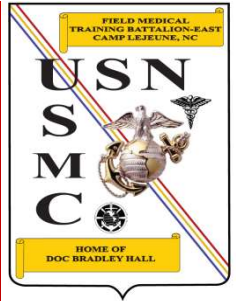


**Junctional Emergency  
Treatment Tool**

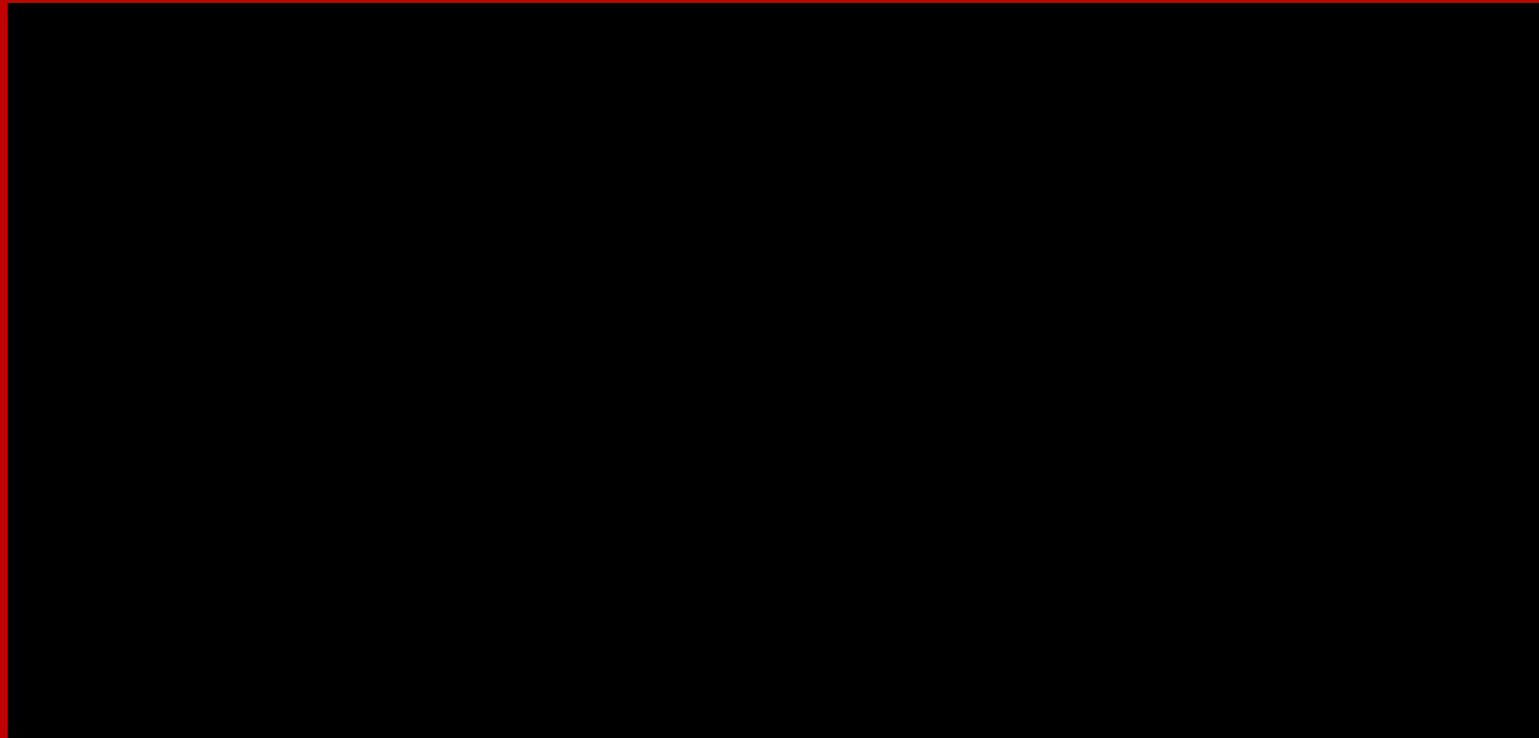


**Sam Junctional  
Tourniquet**

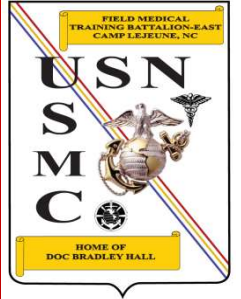
# TCCC Management of Junctional Hemorrhage



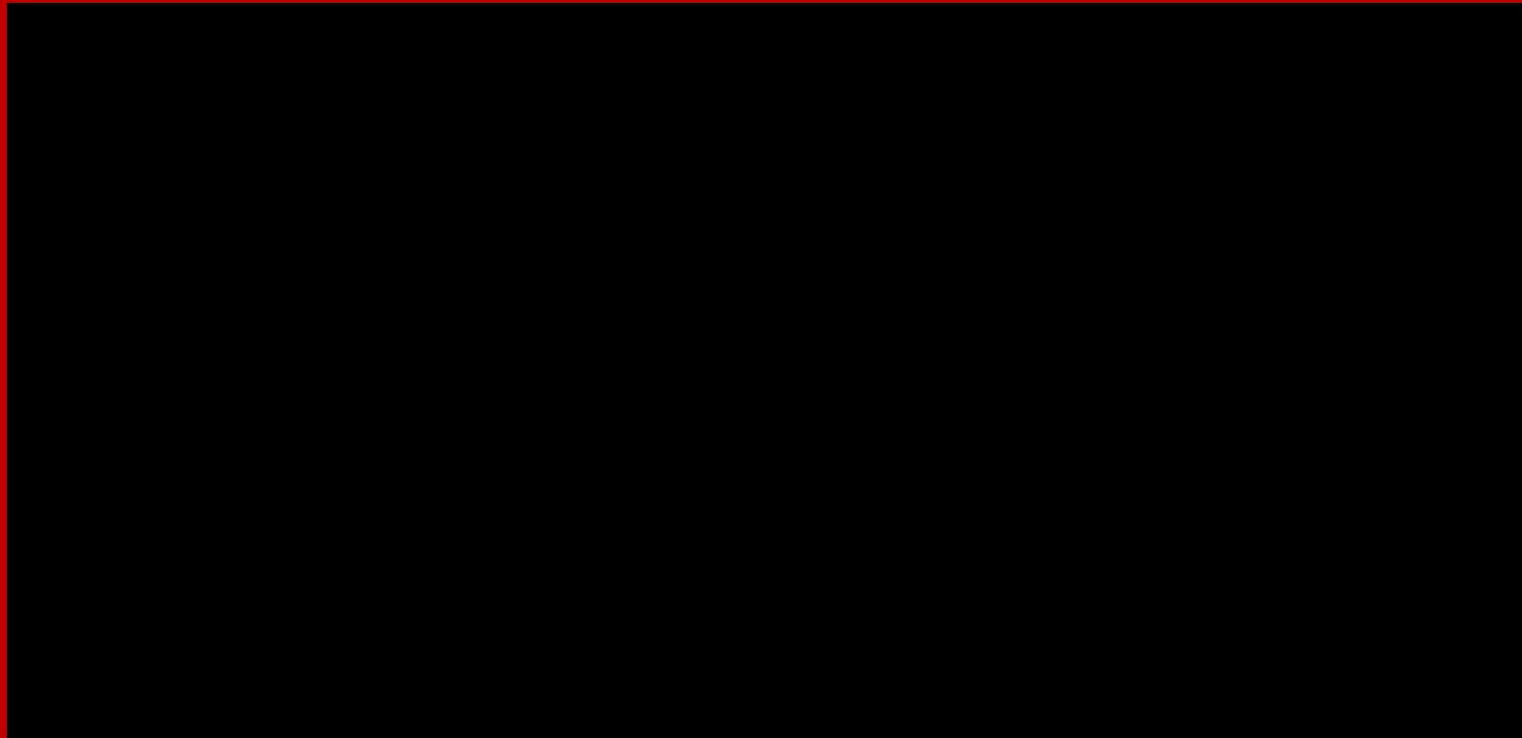
## ■ CRoC



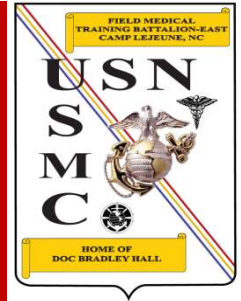
# TCCC Management of Junctional Hemorrhage



## ■ JETT



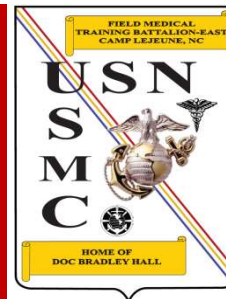
# TCCC Management of Junctional Hemorrhage



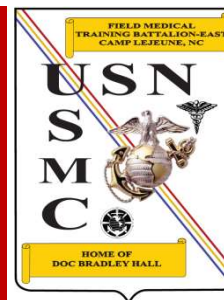
## ■ SAM JUNCTIONAL TOURNIQUET



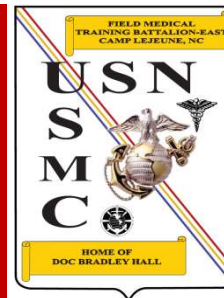
# Continued Reassessment!



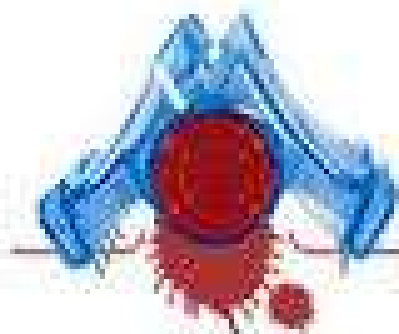
- Once applied, the junctional tourniquet, as well as the casualty's other hemorrhage control interventions, must be frequently reassessed to assure continued hemorrhage control.
  - **DO NOT EVER APPLY IT AND FORGET IT!**



# IT Clamp

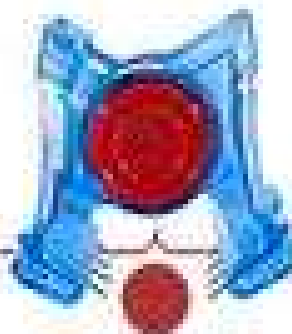


## FOR IMMEDIATE HEMORRHAGE CONTROL



### Clamp iT

Clamp and seal the wound  
with minimal pain



### Contain iT

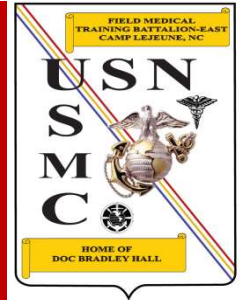
Contained hematoma places  
direct pressure on the  
injured vessels



### Control iT

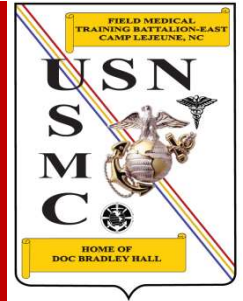
Control your patient's  
emergency in seconds

# IT Clamp

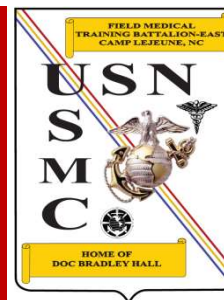


- For external hemorrhage of the head and neck where the wound edges can be easily re-approximated, the iTClamp may be used as a primary option for hemorrhage control.
- Wounds should be packed with a hemostatic dressing or XStat, if appropriate, prior to iTClamp application

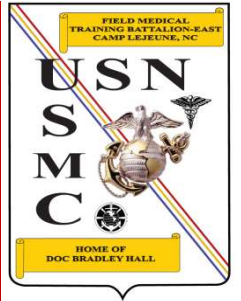
# IT Clamp



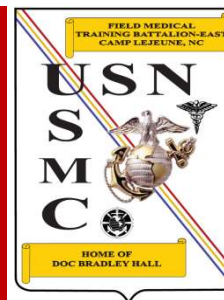
- The iTClamp does not require additional direct pressure, either when used alone or in combination with other hemostatic adjuncts.
- If the iTClamp is applied to the neck, perform frequent airway monitoring and evaluate for an expanding hematoma that may compromise the airway. Consider placing a definitive airway if there is evidence of an expanding hematoma.
- DO NOT APPLY on or near the eye or eyelid

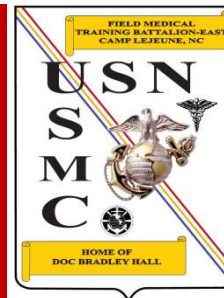


# After management of hemorrhage

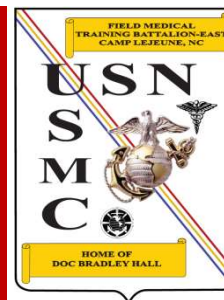


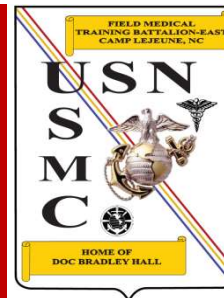
- Perform initial assessment for hemorrhagic shock (altered mental status in the absence of brain injury and/or weak or absent radial pulse) and consider immediate initiation of shock resuscitation efforts.



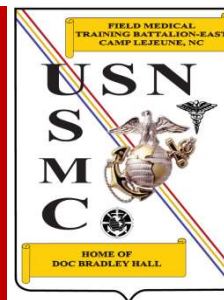


# DEMONSTRATION





# PRACTICAL APPLICATION



# MANAGE HEMORRHAGE

